



U.S. Department of Energy
Energy Efficiency and Renewable Energy

industrial technologies program

Sensors & Automation Annual Review

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Welcome Comments

- ✓ What is ITP ? What is its mission?
- ✓ What does ITP's Sensors & Automation seek to do ?
- ✓ Developments during the past year
- ✓ Commercial successes



Industrial Technologies Program

MISSION

Improve the energy intensity of U.S. industry through coordinated research and development, validation, and dissemination of energy efficiency technologies & practices.

Partner with industry and other stakeholders to:

- Increase energy savings
- Reduce environmental impacts
- Improve process yield/conserves resources
- Reduce reliance on foreign oil
- Increase use of renewable energy
- Improve competitiveness and quality of life



ITP's Sensors & Automation

Goals

- Identify, develop, and deploy integrated measurement systems for operator-independent control of manufacturing processes
- Systems will have application in more than one industry and will be fully compatible with harsh industrial environments



ITP's Sensors & Automation

End-Goal

- Ultimately, these systems will enable a level of productivity and quality currently unattainable under human or machine control and increase energy efficiency by at least 5%



Developments During The Past Year

- Office of Industrial Technologies (OIT) renamed Industrial Technologies Program (ITP)
- Sensors & Automation (S&A) is now a sub-program
- FY '03 solicitation resulted in five awards
 - All five involve sensors
 - Three involve wireless sensors
 - Most involve process control in some way



Developments During The Past Year, cont.

- Extreme Measurement Communications Center (EMC²) at ORNL set up to screen wireless technologies
- SBIR/STTR projects and awards
 - Three Phase II ongoing sensor projects
 - Four Phase I power harvesting wireless sensing project awards
 - One Phase I sensor project award



Wireless Projects Activity Flow

Wireless Technologies

IEEE 1451.5

IEEE802.11b

ZigBee

Bluetooth

Other FHSS

Other DSSS

Ultra Wide Band



Extreme Measurement Communications Center (EMC²) at ORNL

Provides reproducible, traceable lab standards

Verifies performance, interaction, compliance



Field testing in harsh factory-floor environment

Evaluate reliability, robustness, security



Developments During The Past Year, cont.

- Dedicated session at IFPAC on innovative technology from DOE/ITP
- Public peer review – generally favorable
- Golden Field Office fully on board conducting S&A project management
- S&A FY '05 proposed budget cut by 17%

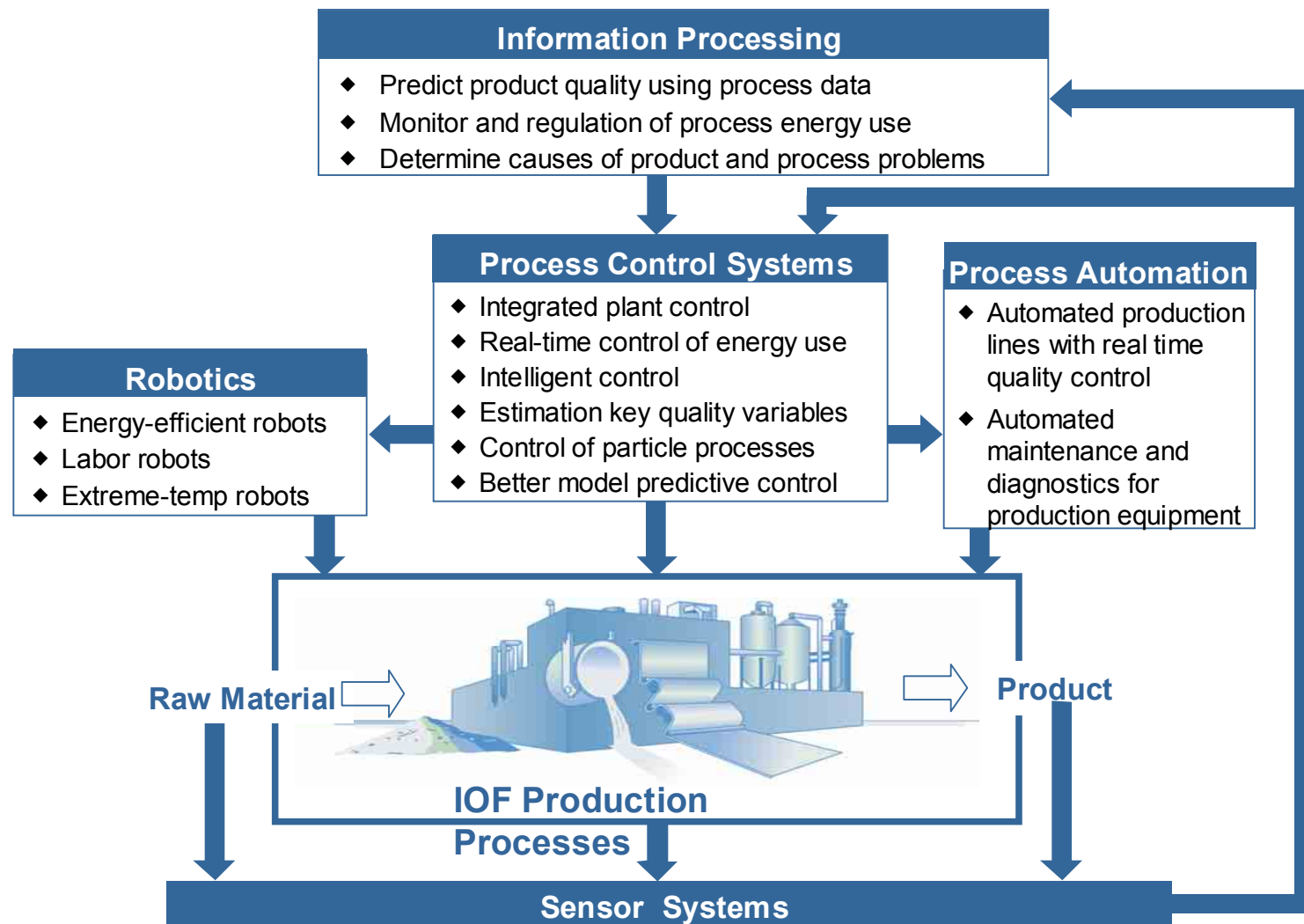


Developments During The Past Year, cont.

- This year's S&A Annual Review is being held jointly with ITP's glass and materials sub-programs
- Completed studies to identify potential research opportunities in controls, information processing, automation and robotics
 - Opportunities identified based on energy efficiency gains



Recommendations for R&D from 2004 Assessment





Recent Accomplishments

- **Laser Ultrasonic Measurement System (LUT)**
 - Uses laser-generated ultrasound to determine thickness of hot seamless steel tubing
 - Timken was prime contractor
 - Use on production line at Timken Company plant began March 2002
 - More than 900,000 tubes inspected to date
 - Annual energy savings at one facility of 23 billion Btus, 5% of the energy used in the process





Recent Accomplishments

- **Hydrogen Monitoring Sensor**
 - Solid-state sensor that rapidly detects concentrations of hydrogen gas from 10 ppm to 100%
 - Sandia National Laboratories developed the basic technology. Penn State was prime contractor.
 - Air Products enhanced and H2scan commercialized the technology
 - Unit costing \$3,300 replaced mass spectrometer costing \$150,000 in hydrogen plant
 - Hundreds of customers as of year end 2003





Proposals And Reviews

- ITP's S&A research area will thrive on good, imaginative ideas. To those of you that submitted proposals . . .thank you
- The proposals must be competently reviewed by technical and industry experts. To those that reviewed proposals . . .thank you



Agenda Highlights

- Project presentations
 - ITP supported projects
 - SBIR Phase II projects
- Poster session and reception